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Sørensen, Thomas Alrik; Ásgeirsson, Árni Gunnar

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Synesthesia induced colors do not bias attention in the same manner as physical colors do

Thomas Alrik Sørensen¹,² & Árni Gunnar Ásgeirsson²,³,⁴,

¹ Centre for Cognitive Neuroscience, Department for Communication and Psychology, Aalborg University
² Cognitive Neuroscience Research Unit, Center for Functional Integrative Neuroscience, Aarhus University
³ Cognitive Psychology Unit, Leiden University
⁴ Department of Psychology, School of Health Sciences, University of Iceland

Background

It has been demonstrated that content of visual short-term memory can guide attentional resources (Carlisle & Woodman, 2011). We want to employ a similar paradigm to investigate whether synesthesia concurrent colors are represented in visual memory as physical colors. If they are, they should bias attention towards same-colored objects in a visual search task.

Experimental variation

Main task: reaction time on an odd-one-out visual search identification task of four colored Landolt squares (↑ or ↓) while an object is retained in visual short-term memory.

- Experiment 1: Color memory item (replication task)
- Experiment 2: Achromatic grapheme memory items
- Experiment 3: Colored grapheme memory items
- Experiment 4: Induced color predicts target (75% valid)

Participants

8 (7 female) observers with grapheme-color synesthetes participated in the study. Mean age was 33.9 years (sd = 7.5).

Design

We replicated the results from Carlisle & Woodman (2011) in experiment 1, using simple colors. However, in experiment 2 the induced colors seem to only drive a potential weaker effect, that was not significant in the current sample, despite that the pattern was similar to experiment 1. In experiment 3 the physical color demonstrate effects similar to experiment 1, however, color-congruency does not affect reaction time. Finally, in experiment 4, there seem to be a tendency that strategic effects could guide attention, however, this tendency is mainly driven by two of the eight participants and thus not a general trend.

Why two observers demonstrate strong strategic effects in experiment 4 is still unclear, and needs to be examined further. But in the four experiments we demonstrate that a synesthetic color concurrent modulate attention differently form physical colors.